

## WHAT IS CLAIMED IS:

## 1. A write once recording medium (WORM) comprising:

a substrate;

a first protective layer on the substrate;

an inorganic recording layer on the first protective layer, wherein the inorganic recording layer, upon heating via irradiation of a laser beam, is induced to undergo a local reaction and heat absorption to form a recorded mark with distinctive reflectivity, and the inorganic recording layer is made of materials comprising those as shown in formula I:



wherein A is comprised of silicon (Si) or tin (Sn); M is selected from the group consisting of aluminum (Al), silver (Ag), Gold (Au), Zinc (Zn), titanium (Ti), nickel (Ni), copper (Cu), cobalt (Co), tantalum (Ta), iron (Fe), tungsten (W), chromium (Cr), vanadium (V), gallium (Ga), lead (Pb), molybdenum (Mo), indium (In), and tellurium (Te); y is in the range of 0.02 ~ 0.8;

a second protective layer on the inorganic recording layer; and

a reflective layer on the second protective layer.

2. The WORM of claim 1, wherein the thickness of the inorganic recording layer is in the range of 3 nm ~ 80 nm.

3. The WORM of claim 1, wherein the first protective layer and the second protective are made of a material selected from the group consisting of silicon nitride ( $\text{SiN}_x$ ), zinc sulfide-sulfur dioxide ( $\text{ZnS-SiO}_2$ ), aluminum nitride ( $\text{AlN}_x$ ), silicon carbide ( $\text{SiC}$ ), germanium nitride ( $\text{GeN}_x$ ), titanium nitride ( $\text{TiN}_x$ ), tantalum oxide ( $\text{TaO}_x$ ), and yttrium oxide ( $\text{YO}_x$ ).

4. The WORM of claim 1, wherein a thickness of the first protective layer and

the second protective layer is in the range of 1 nm ~ 200 nm.

5. The WORM of claim 1, wherein the first protective layer and the second protective layer comprise a single dielectric layer or a complex dielectric layer.

6. The WORM of claim 1, wherein the reflective layer is made of a material selected from the group consisting of Au, Ag, Al, Ti, Pb, Cr, Mo, W, Ta, and an alloy of the foregoing metals.

7. The WORM of claim 1, wherein a thickness of the reflective layer is in the range of 10 nm ~ 200 nm.

8. The WORM of claim 1, further comprising a protective resin layer on the reflective layer.

9. The WORM of claim 1, wherein the protective resin layer comprises a photosetting resin.

10. The WORM of claim 1, wherein the inorganic recording layer comprises an alloy layer formed via a method of co-sputtering deposition, apple pie target sputtering deposition or alloy target sputtering deposition.

11. The WORM of claim 1, wherein the substrate comprises a substrate of CD-R, DVD-R, blue laserR, and blue laser WORM.

12. A WORM comprising:

a substrate; and

an inorganic recording layer on the substrate, wherein the inorganic recording layer, upon heating via irradiation of a laser beam, is induced to undergo a local reaction and heat absorption to form a recorded mark with distinctive reflectivity, and the inorganic recording layer is made of materials comprising those as shown in formula I:



wherein A is comprised of silicon (Si) or tin (Sn); M is selected from the group consisting of aluminum (Al), silver (Ag), Gold (Au), Zinc (Zn), titanium (Ti), nickel (Ni), copper (Cu), cobalt (Co), tantalum (Ta), iron (Fe), tungsten (W), chromium (Cr), vanadium (V), gallium (Ga), lead (Pb), molybdenum (Mo), indium (In), and tellurium (Te); y is in the range of 0.02 ~ 0.8.

13. The WORM of claim 12, further comprising a first protective layer on the inorganic recording layer.

14. The WORM of claim 13, wherein the first protective layer is made of a material selected from the group consisting of silicon nitride ( $\text{SiN}_x$ ), zinc sulfide-sulfur dioxide ( $\text{ZnS-SiO}_2$ ), aluminum nitride ( $\text{AlN}_x$ ), silicon carbide ( $\text{SiC}$ ), germanium nitride ( $\text{GeN}_x$ ), titanium nitride ( $\text{TiN}_x$ ), tantalum oxide ( $\text{TaO}_x$ ), and yttrium oxide ( $\text{YO}_x$ ).

15. The WORM of claim 13, further comprising a reflective layer on the first protective layer.

16. The WORM of claim 13, further comprising:

a first protective layer between the inorganic recording layer and the substrate;

and

a second protective layer on the inorganic recording layer.

17. The WORM of claim 16, wherein the first protective layer and the second protective are made of a material selected from the group consisting of silicon nitride ( $\text{SiN}_x$ ), zinc sulfide-sulfur dioxide ( $\text{ZnS-SiO}_2$ ), aluminum nitride ( $\text{AlN}_x$ ), silicon carbide ( $\text{SiC}$ ), germanium nitride ( $\text{GeN}_x$ ), titanium nitride ( $\text{TiN}_x$ ), tantalum oxide ( $\text{TaO}_x$ ), and yttrium oxide ( $\text{YO}_x$ ).